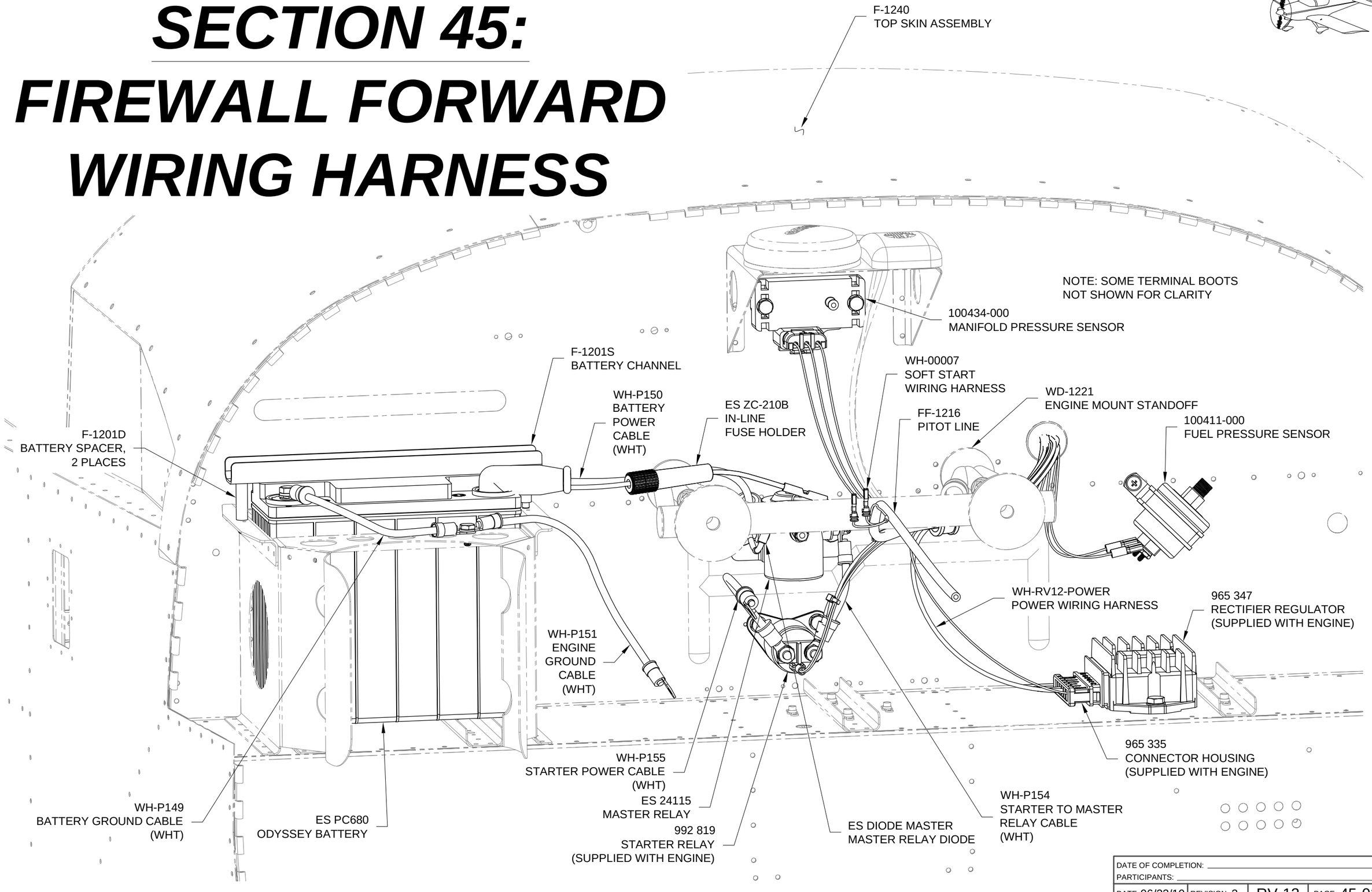
SECTION 45:
FIREWALL FORWARD WIRING HARNESS



DATE OF COMPLETION: _____
PARTICIPANTS: _____

Step 1: Make two F-1201D Battery Spacer from .058X5/16 6061-T6 tube per the dimensions in Figure 1.

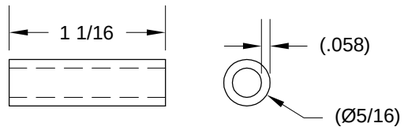


FIGURE 1: MAKING THE BATTERY SPACER

Step 2: Make four F-1257B Battery Anti-Chafe Strips 3 inches long from MS21266-1N Grommet.

Step 2: Place the four F-1257B Battery Anti-Chafe Strips on top of the F-1257 Rudder Pedal Support Channel flanges. Slide the ES PC680 Odyssey Battery into the opening in the firewall assembly. See Figure 2.

Step 3: Secure the ES PC680 Odyssey Battery in place using the F-1201S Battery Channel, F-1201D Battery Spacers and the hardware called out in Figure 2.

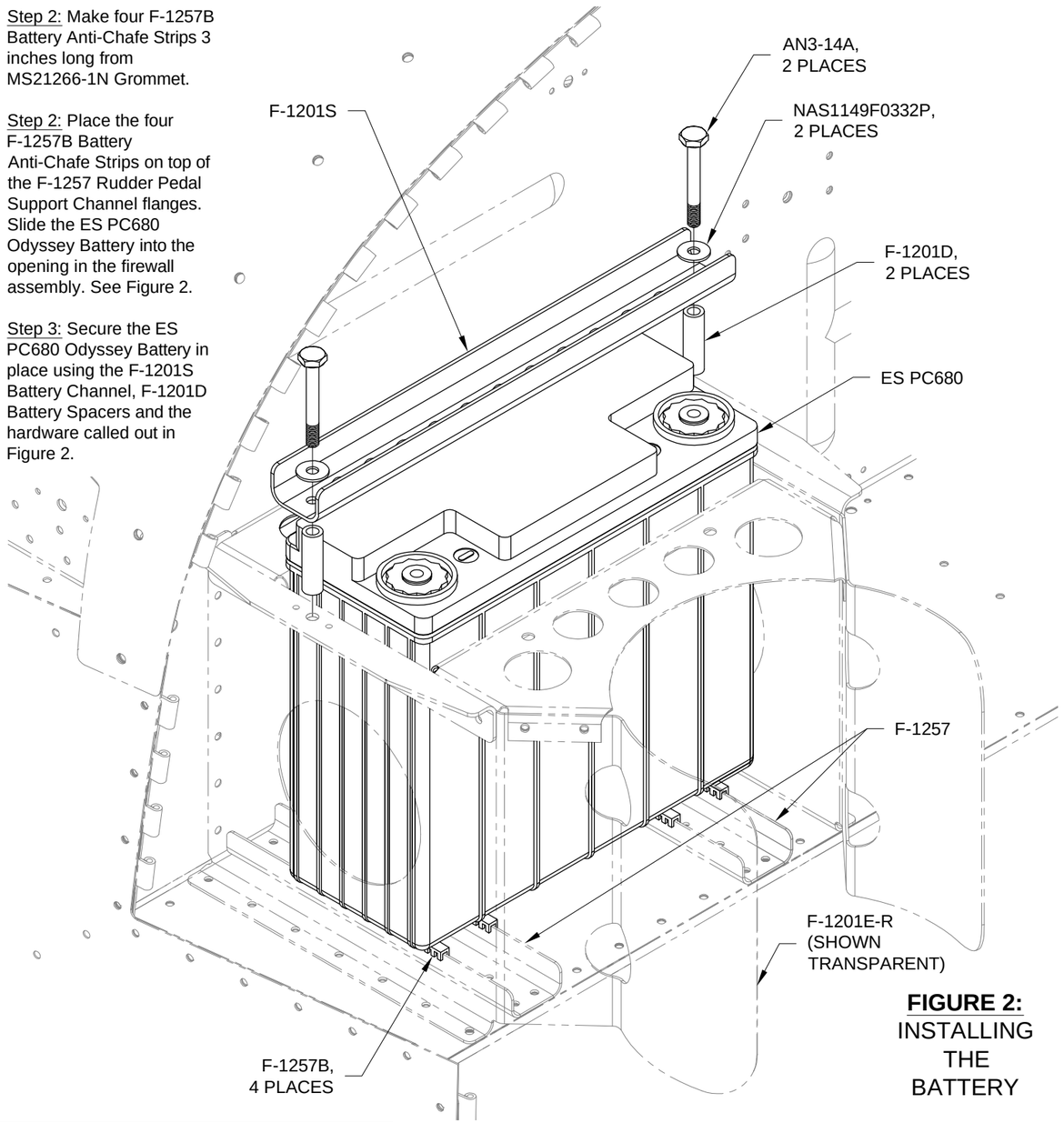


FIGURE 2: INSTALLING THE BATTERY

Step 4: Install the ES 24115 Master Relay, 992 819 Starter Relay, 100434-000 Manifold Pressure Sensor, 100411-000 Fuel Pressure Sensor and 965 347 Rectifier Regulator to the F-1201A Firewall Upper and F-1201B Firewall Shelf using the hardware callouts in Figure 3.

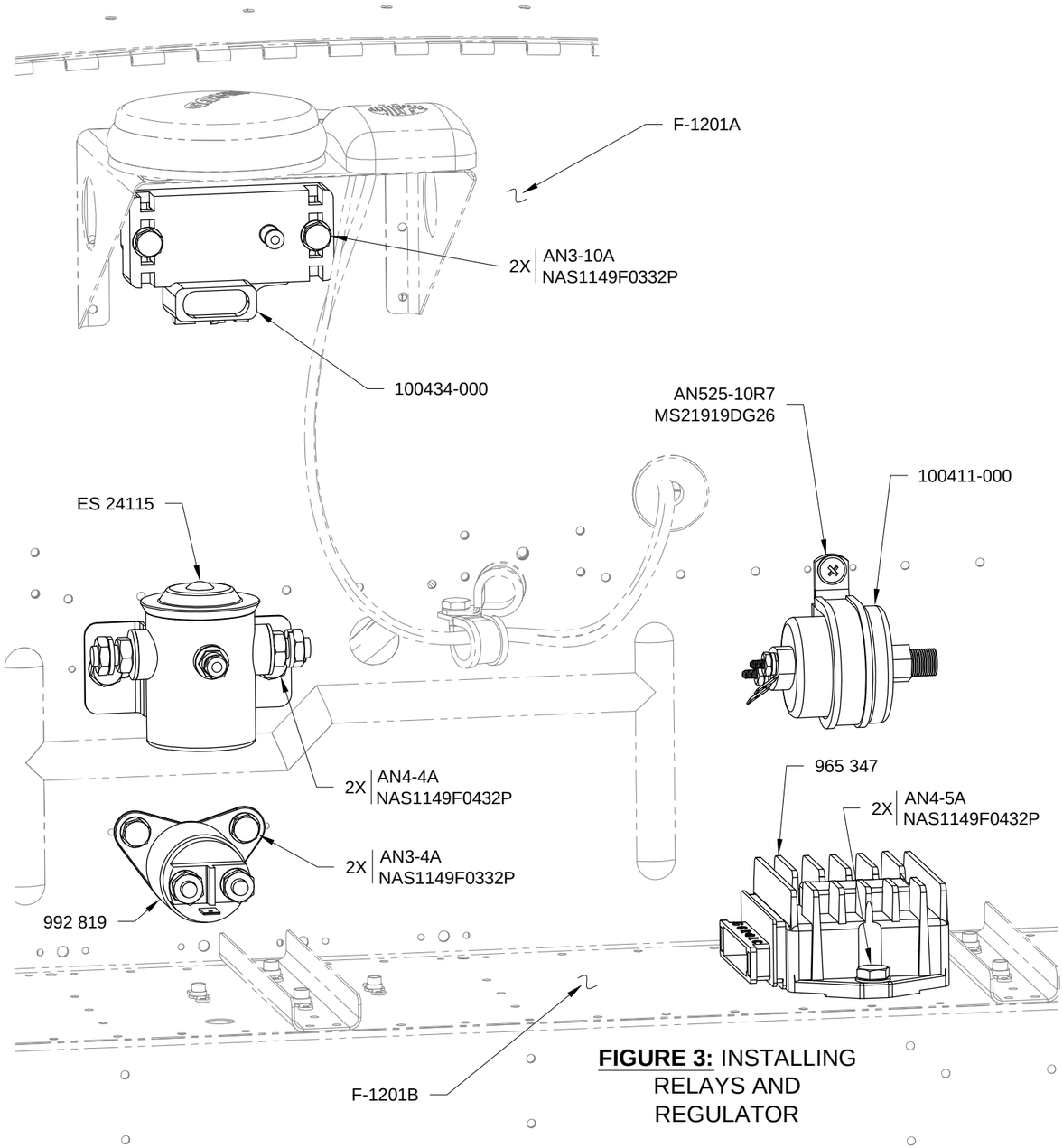


FIGURE 3: INSTALLING RELAYS AND REGULATOR

NOTE: If the Rotax Starter Solenoid supplied with the engine does not match the hole pattern in the F-1201A Firewall Upper use the following steps to add a transfer plate.

Step 1: Machine Countersink the F-1201N Transfer Plate for the head of the screws that will attach the Rotax Starter Solenoid to the transfer plate. **Double check that you are modifying the correct side of the transfer plate.**

Step 2: Use the hardware called-out in Figure 1 to attach the Rotax Starter Solenoid to the F-1201N Transfer Plate.

Step 3: Use the hardware called-out in Figure 2 to attach the F-1201N Solenoid Assembly to the F-1201A Firewall Upper.

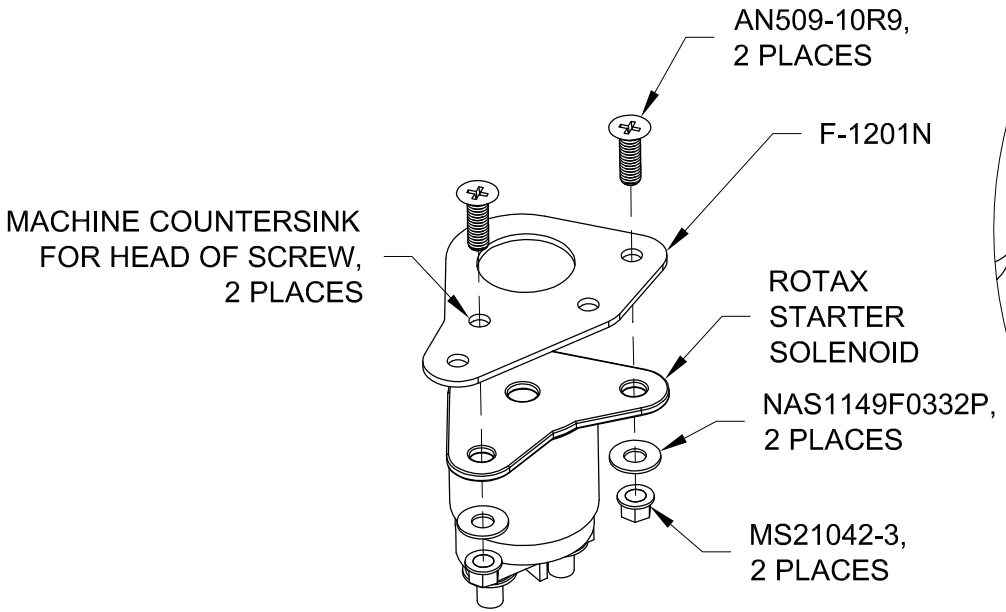


FIGURE 1: TRANSFER PLATE ATTACH

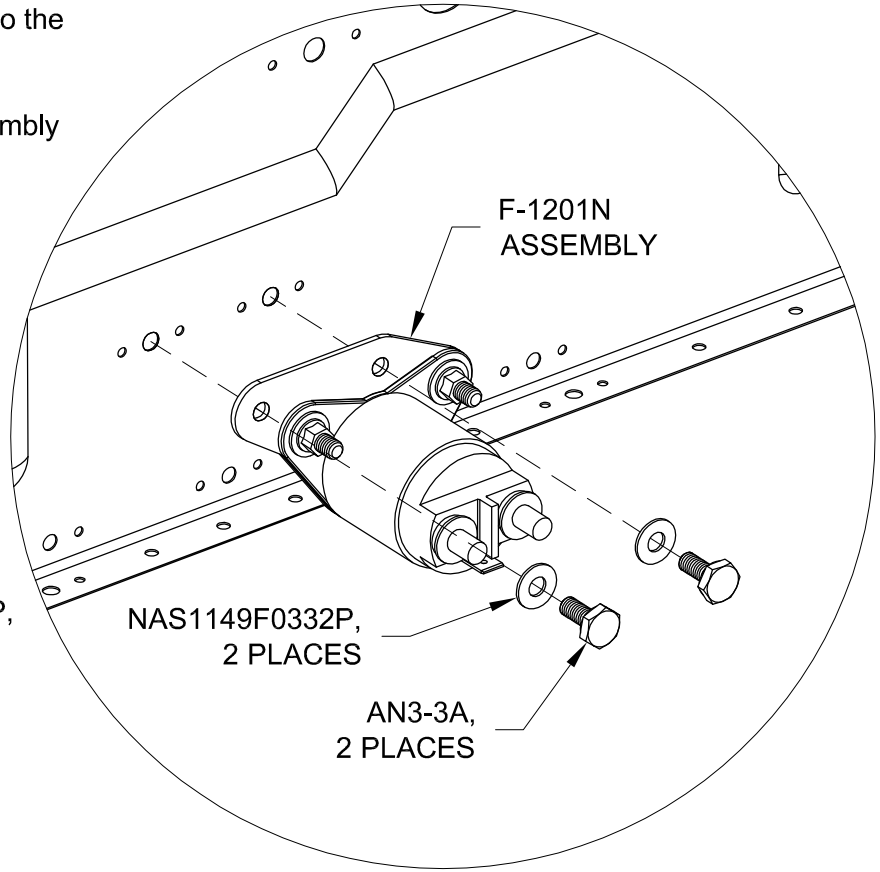


FIGURE 2: SOLENOID ATTACH

Q:\RV-12\MANUAL\POWERPLANT\SECTION 45 - FF WIRING HARNESS\RV-12 SECTION 45 ADDON.dwg

NOTE: Refer to Section 5 for identification of electrical connectors.

Step 1: Cut the ES ZC-210B In-Line Fuse Holder wire at the midpoint of its length as shown in Figure 1.

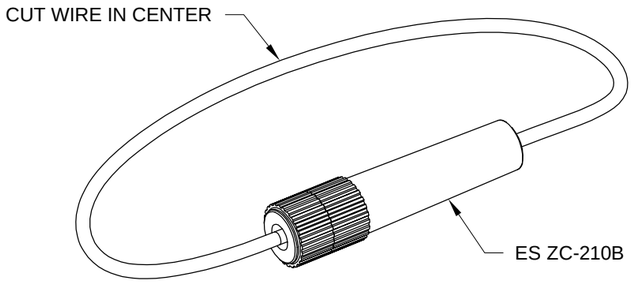


FIGURE 1: CUTTING THE IN-LINE FUSE HOLDER

Step 2: Open the ES ZC-210B In-Line Fuse Holder and check that a 5 amp fuse is installed.

Step 3: Strip the ends of each wire coming from the ES ZC-210B In-Line Fuse Holder.

Step 4: To the end of one wire coming from the ES ZC-210B In-Line Fuse Holder crimp a ring terminal and the other a butt splice as called out in Figure 2.

Step 5: Slide an insulated boot over the end of the WH-P150 (WHT) Battery Power Cable with the smaller ring terminal. Also slide through the boot the ring terminal on the ES ZC-210B In-Line Fuse Holder. See Figure 2.

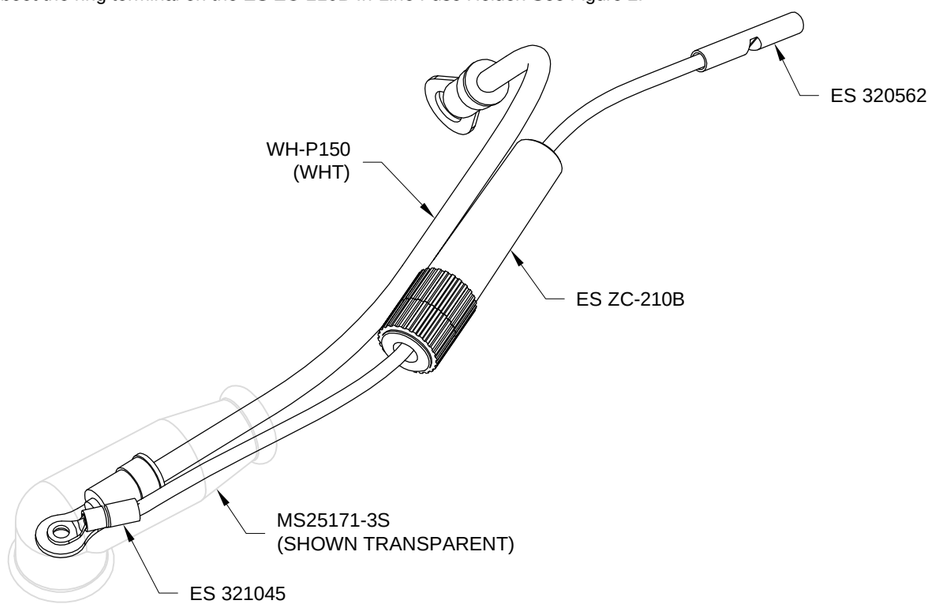


FIGURE 2: BATTERY POSITIVE TERMINAL CABLE AND WIRE

NOTE: ***DO NOT CONNECT*** **the WH-P-149 Battery Ground Cable to the negative (ground) battery terminal at this time! Temporarily connect the ground cable only when necessary for testing at the end of this section or permanently before flight testing the aircraft!**

Step 6: Using the hardware and instructions supplied with the ES PC680 Odyssey Battery attach the WH-P150 (WHT) Battery Power Cable and ES ZC-210B In-Line Fuse Holder to the positive battery terminal. See Figure 3.

Step 7: Using the hardware called out in Figure 3 attach the WH-P149 Battery Ground Cable and the WH-P151 (WHT) Engine Ground Cable to the F-1201G Oil Reservoir Brace.

Step 8: Slide an MS25171-3S Insulated Boot over the unconnected end of the WH-P150 (WHT) Battery Power Cable and tape it in place to isolate the cable from touching the structure of the aircraft.

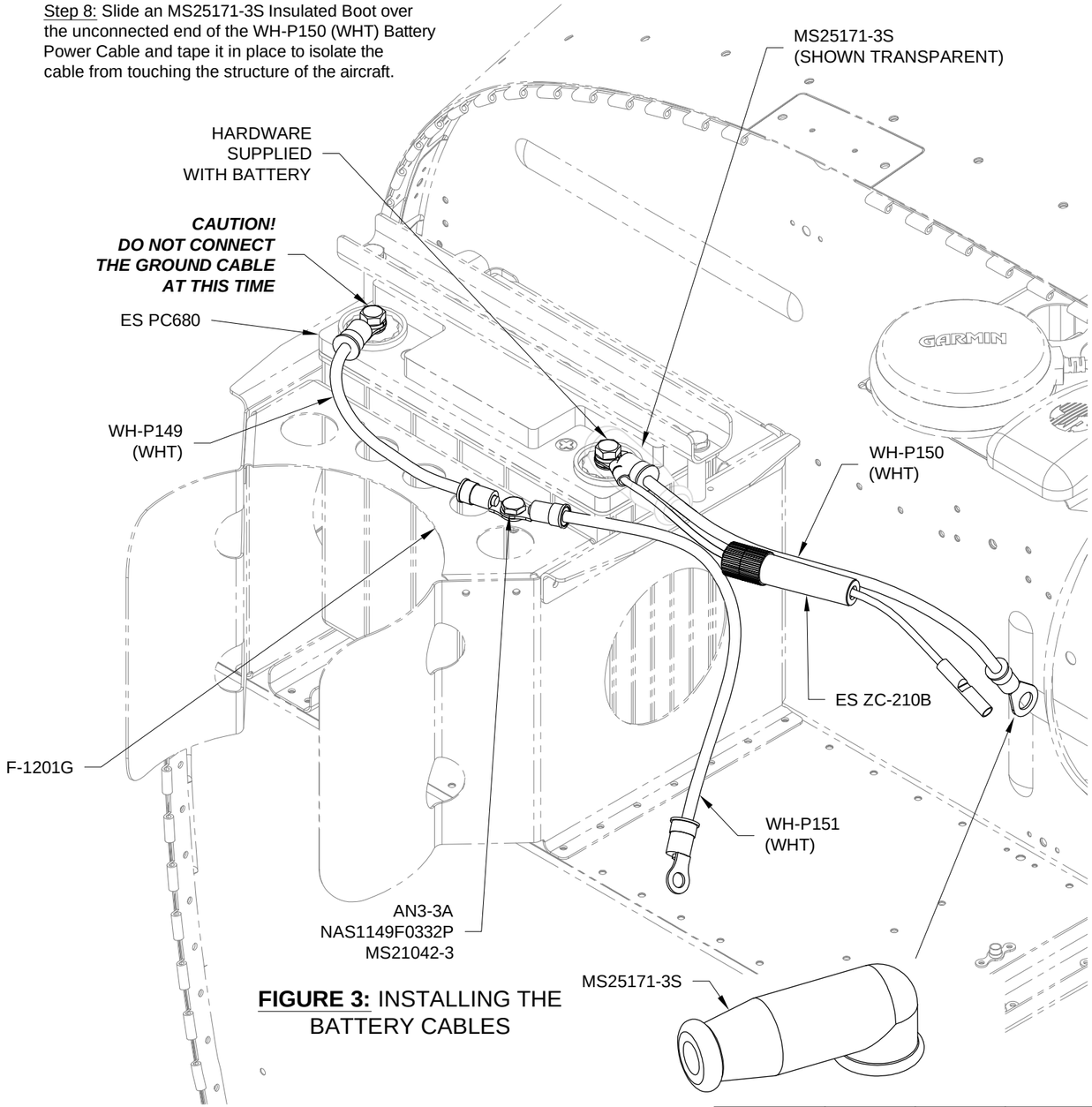


FIGURE 3: INSTALLING THE BATTERY CABLES

Step 1: Remove the F-1240 Top Skin Assembly.

Step 2: Connect the WH-RV12-ROTAX Fwall Fwd Wiring Harness to the back of the AV CONTROL BOARD 12 Switch Fuse Connector PCB as shown in Figure 1.

Step 3: Connect the WH-RV12-POWER Power Wiring Harness to the back of the AV CONTROL BOARD 12 Switch Fuse Connector PCB as shown in Figure 1.

Step 4: Connect the WH-RV12-EGT Exhaust Gas Temp Wiring Harness to the back of the IF DYNON DEK 180-12 Dynon EFIS/EMS as shown in Figure 1.

Step 5: Cut a length of .030X1/4 104-0250031 TUBE 54.5 inches long to make the FF-1216 Pitot Line.

Step 6: Remove the plastic plug from the pitot port of the IF DYNON DEK 180-12 Dynon EFIS/EMS.

Step 7: Remove the male nylon fitting from the F N4MC-2 Nylon 1/4 Straight assembly.

Step 8: Install (hand tight) the male nylon fitting from the F N4MC-2 Nylon 1/4 Straight into the back of the IF DYNON DEK 180-12 Dynon EFIS/EMS as shown in Figure 2.

Step 9: Install the nut, metal keeper, nylon collar and o-ring seal from the F N4MC-2 Nylon 1/4 Straight onto the male nylon fitting in the back of the IF DYNON DEK 180-12 Dynon EFIS/EMS so that three threads of the male fitting are visible.

Step 10: Install the F-12179 Static Line into the F N4MC-2 Nylon 1/4 Straight by cutting the tube(static line) squarely and remove any burrs.

Mark the end of the tube 5/8" from the end.

Moisten the end of the tube with water.

Push tube straight into fitting until it bottoms on the fitting's shoulder.

Tighten nut by hand. Additional tightening should not be necessary, but 1/4 additional turn may be added if desired. DO NOT OVER TIGHTEN nut or threads will strip and the fitting will not function properly. A proper assembly will not show the insertion mark extending beyond the nut. If the insertion mark is visible, then repeat this step.

Step 11: Route the WH-RV12-EGT Exhaust Gas Temp Wiring Harness, WH-RV12-POWER Power Wiring Harness, WH-RV12-ROTAX Fwall Fwd Wiring Harness and FF-1216 Pitot Tube through the cushioned clamp near the left ES CPU FAN, then forward through the wire penetrations grommet in the F-1201A Firewall Upper.

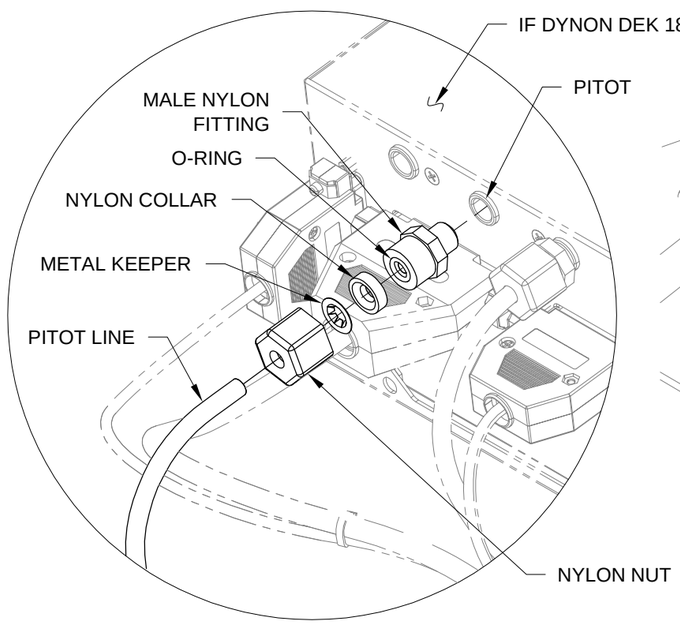


FIGURE 2: CONNECTING THE PITOT LINE

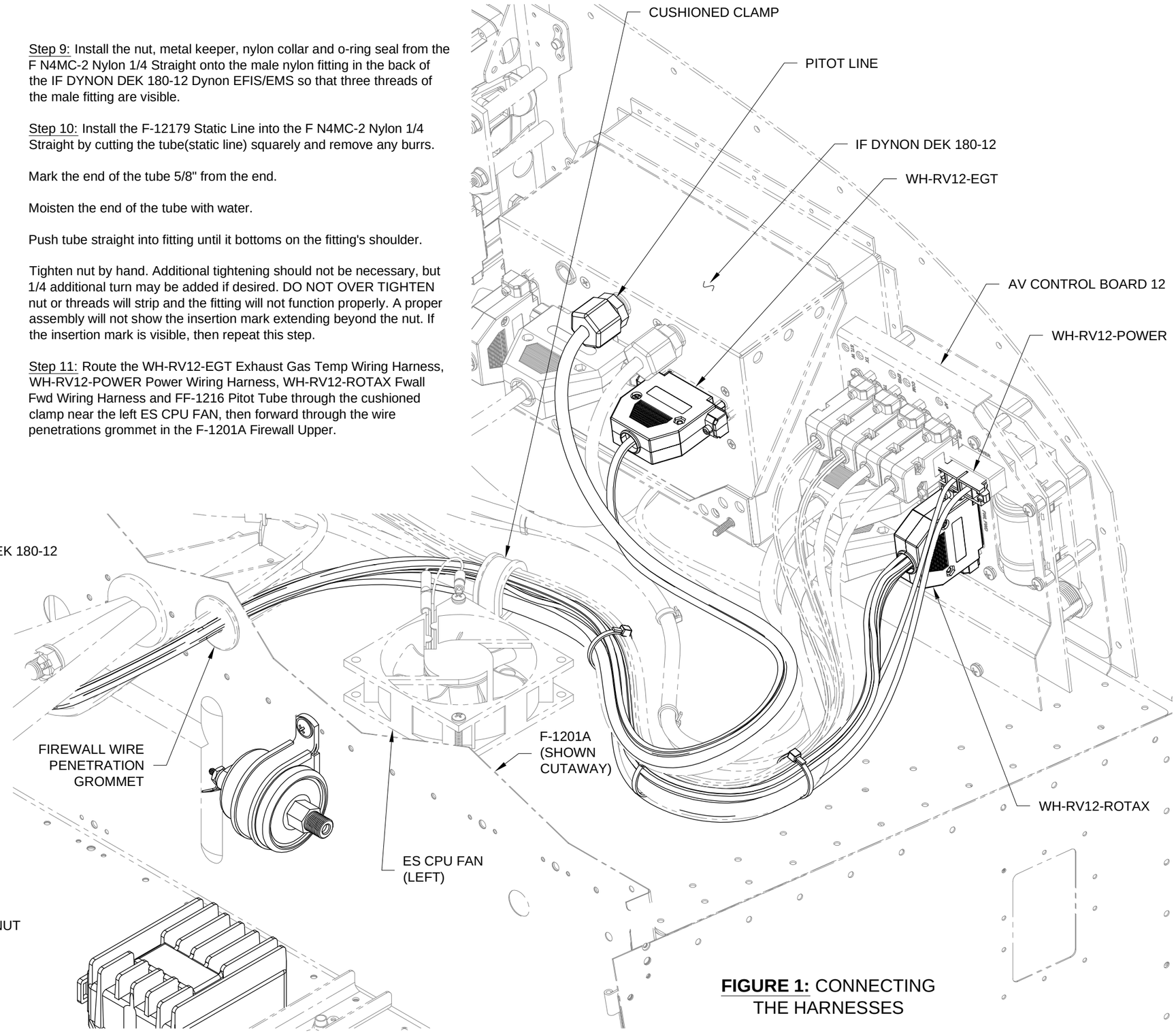


FIGURE 1: CONNECTING THE HARNESSES

Step 1: Separate from the WH-RV12-ROTAX Firewall Forward Wiring Harness the WH-Q143 (BRN) and WH-Q144 (BRN) Fuel Pressure Wires.

Step 2: Strip the ends of the WH-Q143 (BRN) and WH-Q144 (BRN) Fuel Pressure Wires then attach a female spade connector to each wire per the callouts in Figure 1.

Step 3: Attach the WH-Q143 (BRN) and WH-Q144 (BRN) Fuel Pressure Wires to the spade connectors coming from the studs on the 100411-000 Fuel Pressure Sensor as shown in Figure 1. It does not matter which wire goes to which stud.

Step 4: Route the WH-RV12-EGT Exhaust Gas Temp Wiring Harness, the WH-RV12-POWER Power Wiring Harness and the remaining WH-RV12-ROTAX Fwall Fwd Wiring Harness through the cushioned clamp attached to the WD-1221 Engine Mount Standoff.

Step 5: The WH-RV12-POWER Power Wiring Harness consists of two wires coming from a plastic clip attached to the back of the AV CONTROL BOARD 12. Separate out the WH-P156 (WHT) wire that splits into two wires three inches from the end. See Figure 2.

Step 6: Insert each of the spade connectors on the ends of the WH-P156 (WHT) wires into the 965 335 Connector Housing (supplied with the engine) locations shown in Figure 2. Check that the connectors are locked in place by gently tugging on each wire.

Step 7: Separate from the WH-RV12-ROTAX Firewall Forward Wiring Harness the WH-P45 (YEL) Voltage Regulator Control Wire.

Step 8: Insert the spade connector on the end of the WH-P45 (YEL) Voltage Control Wire into the 965 335 Connector Housing location shown in Figure 2. Check that the connector is locked in place by gently tugging on the wire.

Step 9: Insert the 965 335 Connector Housing into the 965 347 Rectifier Regulator as shown in Figure 1.

Step 10: Strip, then crimp the end of the WH-B148 Power Outlet +V wire (routed in the fuselage kit) in the open end of the butt splice attached to the ES ZC-210B In-Line Fuse Holder. See Figure 1.

Step 11: Separate out and strip the ends of both red and both yellow wires coming from the brown WH-RV12-EGT Exhaust Gas Temp Wiring Harness and crimp on ES 421-0107 spade connectors to the end of each wire.

Step 12: Find both 100405-001 EGT Sensors.

Snip off the existing spade terminals leaving as much wire as possible.

Strip the end of the wires then crimp on ES 421-0108 spade connectors to the end of each wire.

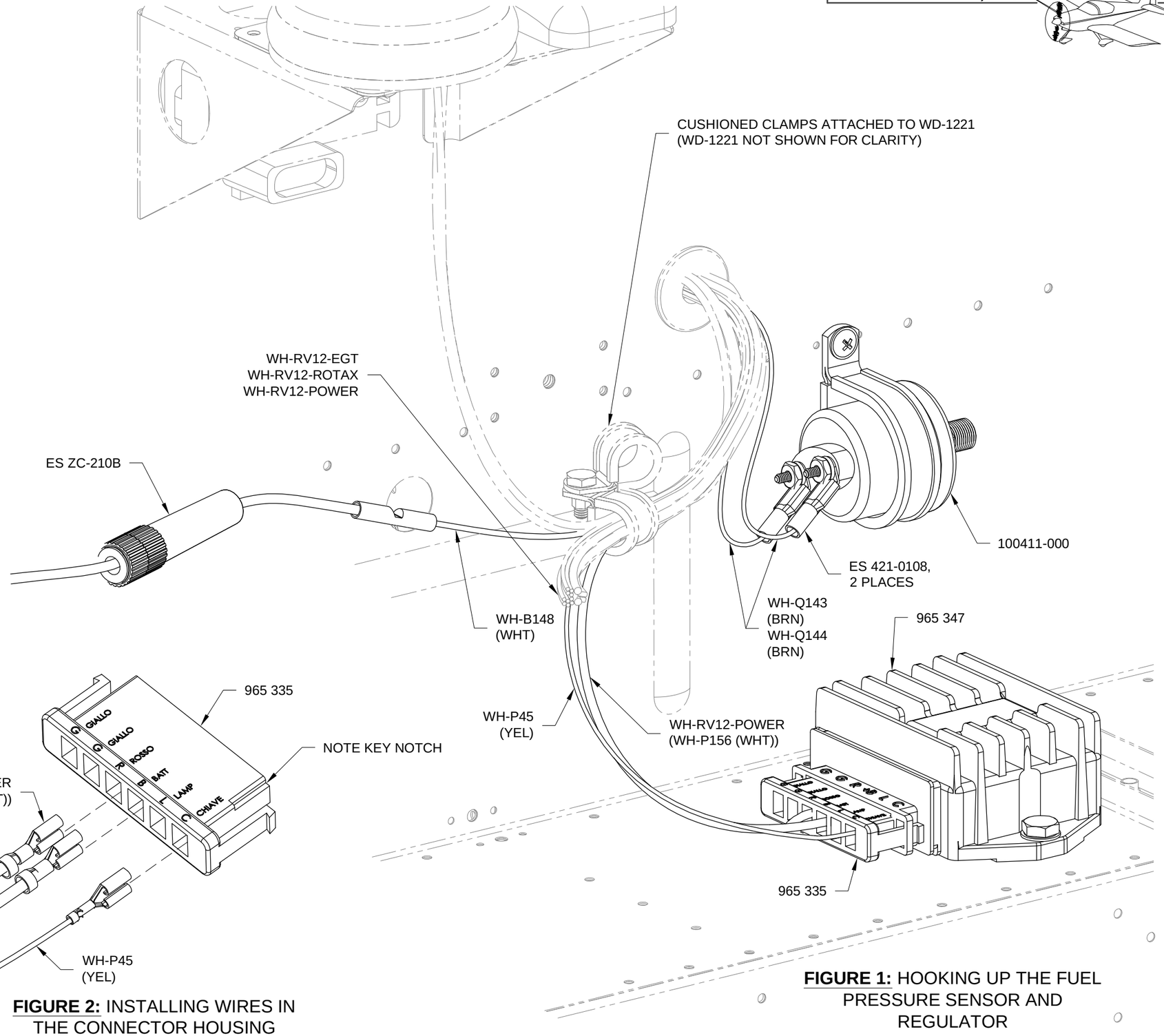


FIGURE 1: HOOKING UP THE FUEL PRESSURE SENSOR AND REGULATOR

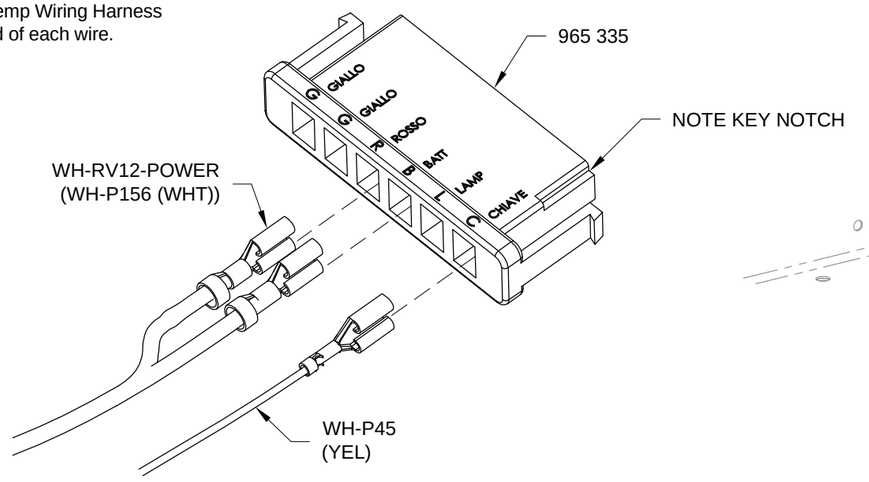


FIGURE 2: INSTALLING WIRES IN THE CONNECTOR HOUSING

Step 1: Separate out from the WH-RV12-ROTAX Fwall Fwd Wiring Harness the WH-F139 (BLK) Manifold Pressure A, WH-F138 (GRN/RED) Manifold Pressure B and WH-F137 (WHT/RED) Manifold Pressure C wires.

Step 2: Find the Weatherpak three position connector used with the 100434-000 Manifold Pressure Sensor. Holding the connector right side up as it will be installed in the aircraft (see Figure 1) snap the WH-F139 (BLK) Manifold Pressure A, WH-F138 (GRN/RED) Manifold Pressure B and WH-F137 (WHT/RED) Manifold Pressure C wires into the connector as called out in Figure 1. Check with a gentle tug that all three wires are snapped into place. Snap the connector housing closed to retain the wires and seals.

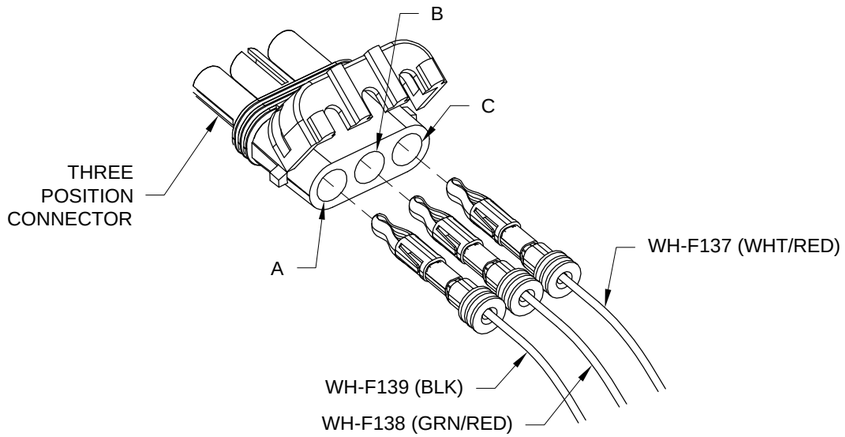


FIGURE 1: INSTALLING WIRES IN THE CONNECTOR HOUSING

Step 3: Install the three pin connector from Step 2 into the 100434-000 Manifold Pressure Sensor as shown in Figure 2.

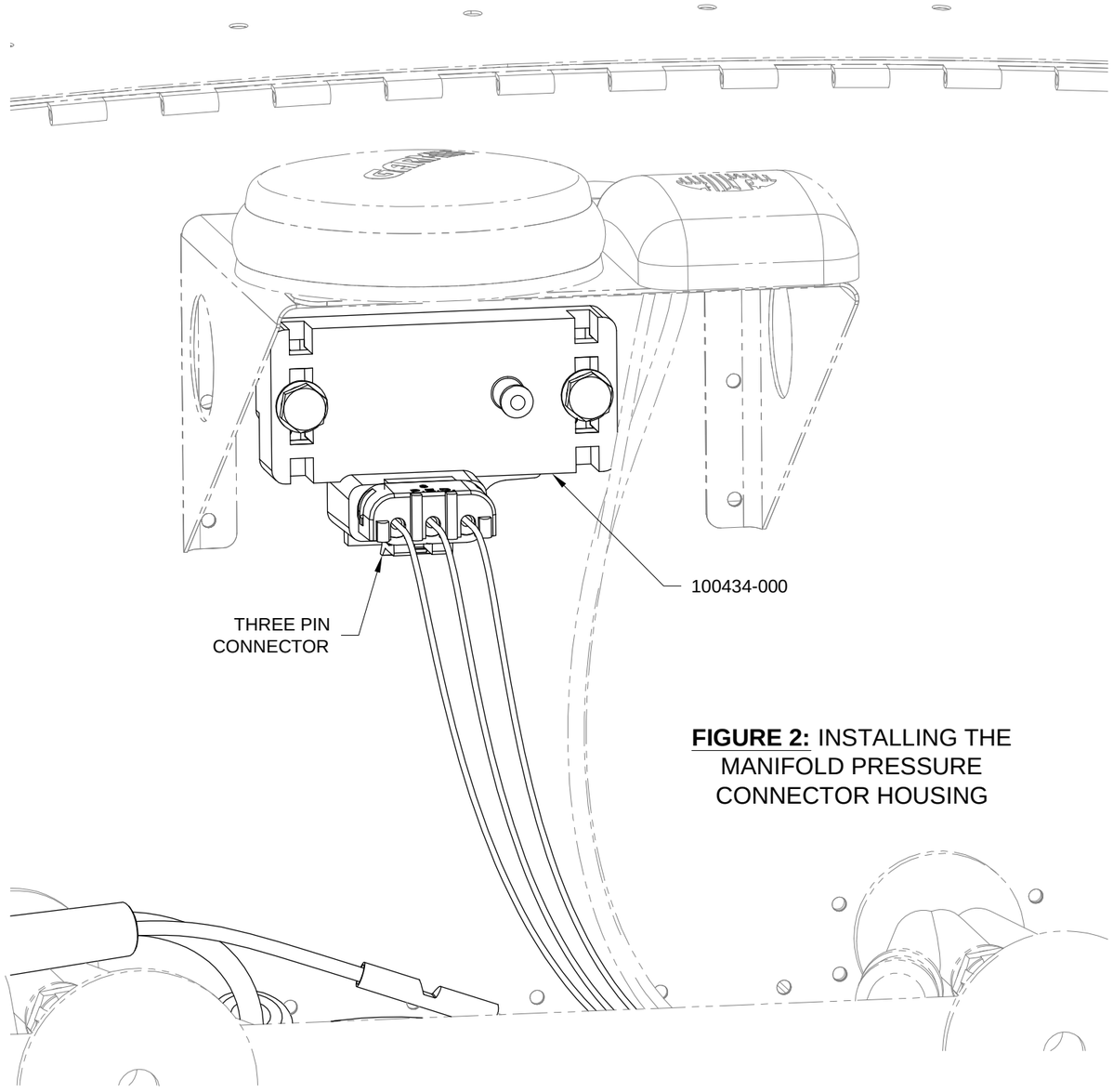


FIGURE 2: INSTALLING THE MANIFOLD PRESSURE CONNECTOR HOUSING

Step 1: Locate the ES 24115 Master Relay. Remove the outer nut and washers from each of the three studs on the relay. Do not remove the nut that lies against the relay body.

Step 2: Locate the ES DIODE MASTER Master Relay Diode. Slip the ring terminal nearest the red band through an insulated boot and onto to the stud of the ES 24115 Master Relay, as shown in Figure 1. Through the same insulated boot and over the same stud, slip the larger ring terminal on the WH-P150 (WHT) Battery Power Wire. Use the nut and lock washer provided with the master relay to tighten these terminals down on the stud. See Figure 1.

Step 3: Separate out the WH-P44 (WHT/ORN) Master Relay wire from the WH-RV12-ROTAX Fwall Fwd Wiring Harness. Strip the end of the wire then crimp a ring terminal onto the end per the call-out in Figure 1.

Step 4: Slip the unconnected ring terminal on the ES DIODE MASTER Master Relay Diode and the ring terminal on the end of the WH-P44 (WHT/ORN) Master Relay wire through an insulated boot and onto the stud on the front of the ES 24115 Master Relay. Use the nut and lock washer provided with the master relay to tighten these terminals down on the stud. See Figure 1.

Step 5: Slip an insulated boot over the end of the WH-P154 (WHT) Starter to Master Relay Cable then connect the ring terminal to the remaining stud on the ES 24115 Master Relay as shown in Figure 1. Use the nut and lock washer provided with the master relay to tighten this terminal down on the stud.

Step 6: Remove the outer nut and washers from the two studs on the 992 819 Starter Relay.

Step 7: Find the WH-P157 (WHT) Battery Power Wire from the WH-RV12-POWER Power Wiring Harness where it was routed through the cushioned clamp attached to the WD-1221 Engine Mount Standoff. Strip the end of the battery power wire and attach a ring terminal per the call-out in Figure 1.

Step 8: Slip the unconnected ring terminal on the WH-P154 (WHT) Starter to Master Relay Cable and the ring terminal on the end of the WH-P157 (WHT) Battery Power Wire through an insulated boot and onto the stud on the 992 819 Starter Relay as shown in Figure 1. Use the nut and lock washer provided with the start relay to tighten these terminals down on the stud. See Figure 1.

Step 9: Slip one end of the WH-P155 (WHT) Starter Power Cable through a insulated boot and onto the remaining stud on the 992 819 Relay. Use the nut and lock washer provided with the start relay to tighten this terminal down on the stud. See Figure 1.

Step 10: Separate the WH-K47 (ORN) Start Power wire from the WH-RV12-ROTAX Fwall Fwd Wiring Harness. Strip the end of the wire. Find the WH-00007 Soft Start Wiring Harness. Strip the end of the wire without a terminal attached. Crimp both wires into a female spade connector per the call-out in Figure 1.

Step 11: Attach the female spade terminal on the end of the WH-00007 Soft Start Wiring Harness and WH-K47 (ORN) Start Power wire to the spade terminal located on the lower center part of the 992 819 Relay.

Step 12: Route the WH-00007 Soft Start Wiring Harness up the WH-K47 (ORN) Start Power wire then attach the remainder to the FF-1216 Pitot Line as shown in Figure 1.

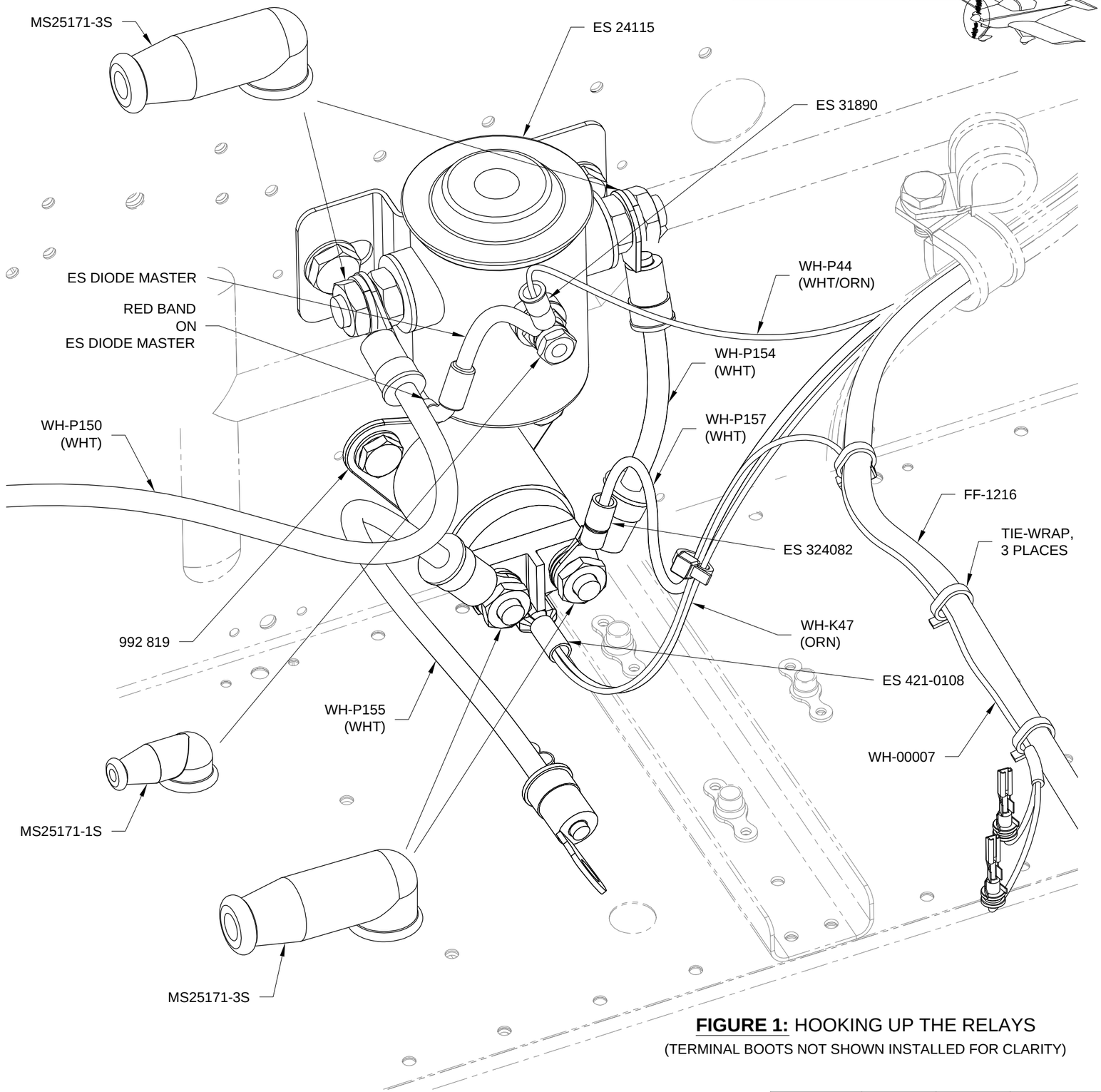


FIGURE 1: HOOKING UP THE RELAYS

(TERMINAL BOOTS NOT SHOWN INSTALLED FOR CLARITY)

Step 1: The electrical system is now complete less the connections to the engine. Turn on the master switch on the AV CONTROL BOARD 12 and complete the setup on this page.

NOTE: Only adjust potentiometers using a non metallic screwdriver or wrap a screw driver with tape to prevent shorting out components on the AV CONTROL BOARD 12 to its own back plate.

NOTE: Be gentle when adjusting the potentiometers. It is possible to run off the end of the adjustment range when turning the potentiometer. The item being adjusted will then be completely turned off. If this happens turn the pot back into the normal adjustment range.

NOTE: The rate at which the trim motor will move the anti servo tab from stop to stop will be defined as the trim rate. This rate will vary with the main bus voltage. The higher the voltage the faster the trim rate. If you are setting the rate with the aircraft battery connected to a charger the main bus will be close to 14V. With a fully charged battery powering the main bus the voltage will be just over 12V.

Step 2: The trim rate is adjusted by turning the trim rate adjust potentiometer along the lower edge of the board. See Figure 1. Set the trim rate at 25 to 30 seconds with the main bus voltage at 12V.

NOTE: The AV GARMIN X96 GPS audio output as well as the audio input from the music input jack located in the F-1203 Bulkhead Assembly go through separate stereo inputs on the AV CONTROL BOARD 12 into the intercom. The audio level adjustments on the board are for all mono inputs from the radio, transponder, efis, autopilot and transponder. Note the AV GARMIN GTX327 transponder has no audio output.

Step 3: Plug a headset into the pilot headset jacks. If the headset has volume control adjust the volume to the middle of the range. Turn on all audio devices connected to the board. Use a local ATIS or AWOS for radio input.

Step 4: Adjust the radio volume knob to full volume. Adjust the radio sound level potentiometer on the AV CONTROL BOARD 12 until the radio is too loud and slightly distorted.

Turn the radio volume knob back to about 2/3 volume then adjust all of the potentiometers along the upper edge of the board until the radio and autopilot (if installed) volumes are equal. Set the Dynon volume slightly higher than the radio and autopilot so the Dynon warning tones can be heard above the radio and autopilot levels.

Step 5: Set the stall warning so that with all other sounds on, the stall warning sound level is higher (to the point of drowning out the other sound levels).

Step 6: After tie-wrapping wires as required to prevent wires from chafing etc., re-install the F-1240 Assembly as shown on Page 29-05 and Page 29-07.

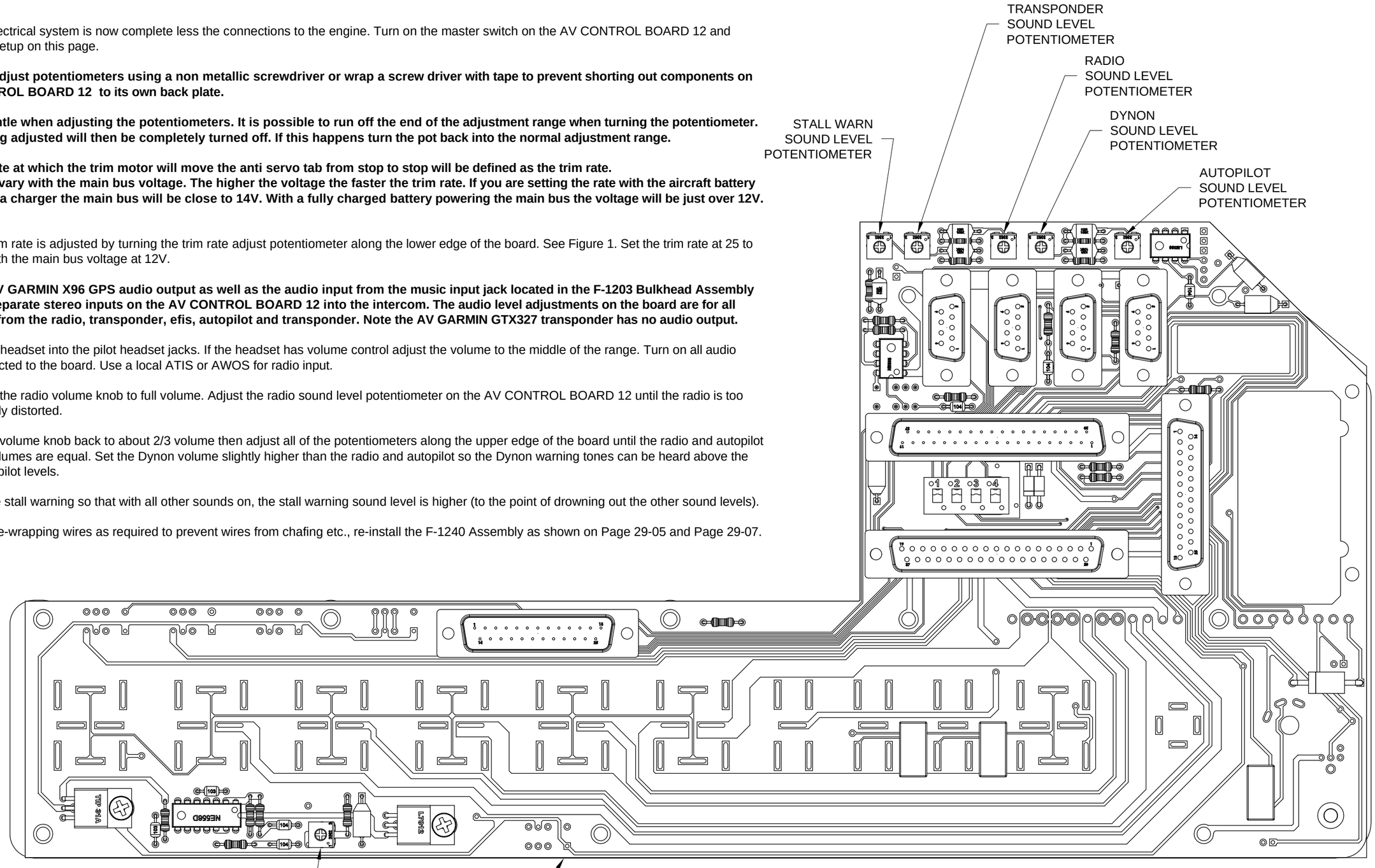


FIGURE 1: BOARD SETTINGS
(F-1202W NOT SHOWN FOR CLARITY)

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